



Fiber Optic Cleaning Procedure

Note:

Before using this information and the products it supports, be sure to read the general information under “Notices,” on page 11.

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Safety

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION:

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following: laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

Wear safety glasses when cleaning parts with solvents, chemicals or compressed air.

(L011)



Attention: Do not substitute commercial compressed air due to the potential of oil contamination.

Preface

Fiber optic server interfaces include:

- Enterprise Systems Connection (ESCON®)
- Fiber Connection (FICON®)
- Fiber Distributed Data Interface (FDDI)
- Intra-System Coupling (ISC)
- OSA Express (Gbe) Gigabit Ethernet
- OSA Express (ATM) Asynchronous Transfer Mode
- External Time Reference (ETR)

Each requires connectivity planning for different fiber types and new fiber optic connectors. Similarly, connectivity requirements for every I/O device must be known because their connectors may not be the same as the connectors on a server, director, or switch. Fiber optic technology is evolving rapidly with new standards, small form factor connectors, and enhanced fiber types. IBM offers a full range of services for optical cabling. For more information, see *Planning for Fiber Optic Links*, GA23-0367. Also, for information about network integration and deployment, see the following web addresses:

- <http://www-1.ibm.com/services/us/index.wss/so/gn/a1000170>
- <http://www-1.ibm.com/services/us/index.wss/so/gn/a1000181>

Although there are a multitude of fiber optic connectors, the components of those connectors are virtually the same: the ferrule (male), the end-surface, and the coupler (female). This publication contains the cleaning procedures for those fiber optic components.

Terms associated with Fiber Optic cabling include:

1. Long wavelength laser (LX)
2. Short wavelength laser (SX)
3. Single Mode (SM)
4. Multimode (MM)
5. Mode Conditioning Patch cabling (MCP)
6. Fiber Optic SubAssembly (FOSA)
7. Fiber Channel Standard (FCS)

| 8. Multi-Terminated Push-on (MTP)

Notes:

1. The optical ports of a transmitter-receiver subassemblies and laser source module should be cleaned *only* when reduced optical performance exists.
2. If filtered dry air is available from a central source, then blow dry air over connector ferrules, end surfaces and inside couplers to help remove contamination.

Although figures in this publication show Enterprise System Connections (ESCON) components, these procedures apply to any fiber optic components, including Fiber Channel Standard (FCS).

| Precautions

| Please use the following precautions when handling fiber optic equipment:

- | • Make sure the cable cutouts in the floor tiles have the appropriate protective edging.
- | • Route the cables away from any sharp edges or projections that could cut the outer jacket.
- | • Do not route the cables near unprotected steam or refrigeration lines.
- | • Do not coil the cable to less than a 96.0 mm (3.78 in.) diameter.
- | • Do not bend the cable to less than a 12 mm (0.5 in.) radius.
- | • Do not pull cables into position; place them.
- | • Do not grasp the cable with pliers.
- | • Do not attach a pull rope or wire to the connectors.
- | • **Always clean the connectors before installing, attaching, or replugging them to reduce link loss.**
- | • **Do not remove the protective plugs or protective covers until you are ready to clean the connectors and attach the cables to a device.**
- | • **Always leave the protective plugs and protective covers on unused ports and cable connectors.**
- | • Connect the cable carefully to prevent damage to the connector housing or the fiber optic ferrules.

- Before inserting the connector, make sure the connector and receptacle keying are aligned.
- Ensure that each FDDI connector has the correct keys installed for the intended application.

Materials Required

The following fiber optic cleaning materials are available through IBM Mechanicsburg:

Item	IBM Part Number
Alcohol pads	9900679
Cleaning Cassette	12R7003
Cleaning Kit	46G6844

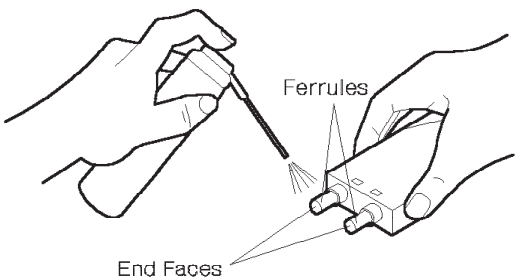
- Note:** Included in the Cleaning Kit are 18 lint free cloths, 10 Microswabs, and 10 foam swabs.

General Cleaning Procedures

Before performing any of the following procedures, read the statements in "Safety" on page iii.

- End-faces on fiber optic connectors must be free of dust and other debris which could interfere with signal quality.
- To facilitate cleaning, use Cleaning Kit IBM PN 46G6844 designed for both connectors and TRSs. This kit contains 18 lint free cloths, 10 Microswabs, and 10 foam swabs.
- To facilitate cleaning of MPO/MTP style connectors, use Cleaning Cassette IBM PN 12R7003, which has been specifically released for end-face cleaning.
- Compressed gas (ref CO2) may be used to remove dust. Compressed air is not recommended due to possible oil contamination.

Note: If compressed air is used, keep the air nozzle approximately 50 millimeters (2 inches) from the component and continue blowing into the component for 5 seconds.

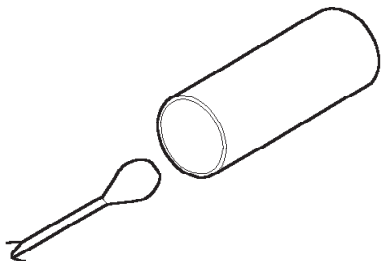


- Dust caps applied over the connector end-face should always be used on unplugged connectors.
- The ONLY acceptable solution for cleaning is isopropyl alcohol. Do NOT use water for cleaning.

Single Coupler

Clean the inside of the coupler with a swab saturated with isopropyl alcohol. Swabs can be found in Cleaning Kit PN 46G6844.

- | **Note:** Always check the area you have just cleaned
- | to be sure it is free of lint or cotton fuzz.

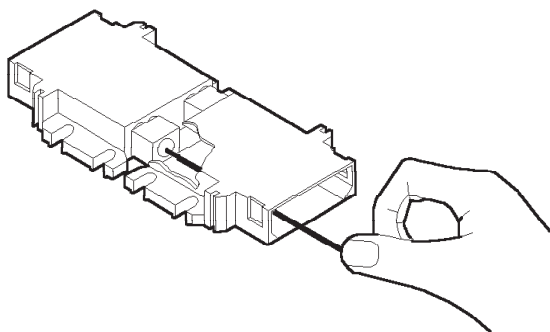


Duplex Coupler

- | This procedure is used to clean any duplex coupler.

Clean the inside of the coupler with a swab saturated with isopropyl alcohol. Swabs can be found in Cleaning Kit PN 46G6844.

- | **Note:** Always check the area you have just cleaned
- | to be sure it is free of lint or cotton fuzz.

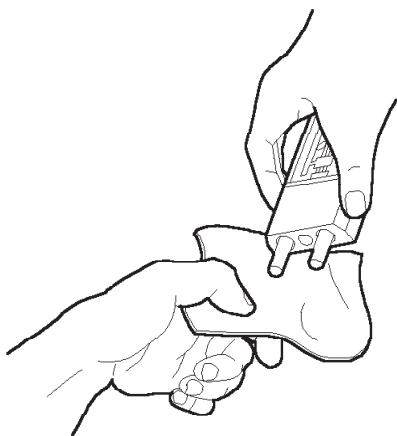


Wrap Plug

This procedure is used to clean any wrap plug

1. Retract the wrap plug protective cover (if present) to expose the ferrules. Keep the connector protective cover retracted during this procedure.
2. Gently wipe the ferrule and the end-face surface of the wrap plug with an alcohol pad. Make sure the pad makes full contact with the end-face surface. Wait 5 seconds for the surface to dry.

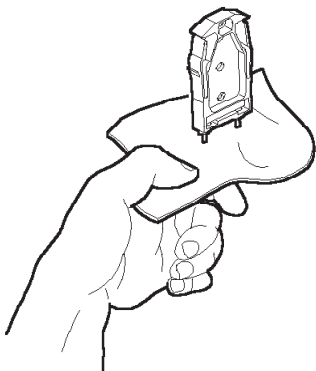
Repeat three times with fresh surfaces of the alcohol pad. Allowing 5 seconds for the surface to dry between applications.



Protective Plug

This procedure is used to clean any protective plug. Before performing this procedure, complete the appropriate procedure for cleaning the coupler or transmitter-receiver subassembly (TRS) into which the protective plug will be inserted.

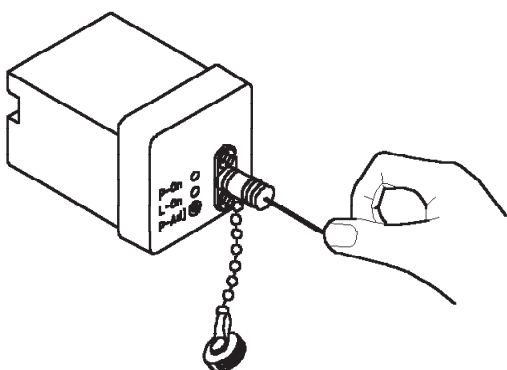
1. Gently wipe the plastic tip of the protective plug at least 5 times with an alcohol pad using a pinch and twist motion. Give special attention to the ridges at the ends of the tips.
2. Wait 5 seconds for the alcohol to dry
3. Immediately insert the protective plug into the TRS assembly or coupler. Make sure the two latches are properly engaged with the shell.



Laser Optical Source Module

Note: The optical ports of the laser source module should be cleaned *only* when reduced optical performance or visible port contamination exists.

1. Remove the optical cover from the laser module.
2. Clean the inside of the optical port with a dry Microswab. Rotate the swab once in a clockwise direction.
3. Retry the measurement procedure. If optical performance is still not improved, replace the module.

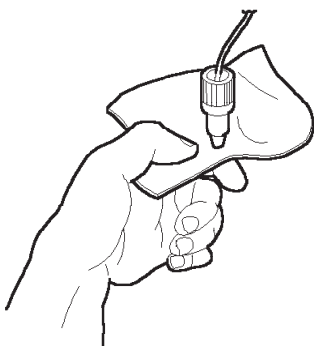


Fiber Optic Cable Connector

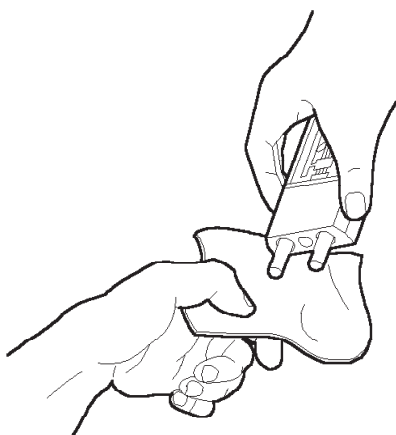
Use this general procedure to clean any fiber optic cable connector. Repeat these steps as necessary.

1. Gently wipe endface with lint-free pad in one direction.
2. Using a can with compressed gas held upright and approximately 2 inches from the connector end, release a stream of gas on the connector endface for no more than 5 seconds.
3. Gently wipe the ferrule and the end-face surface of the connector with an alcohol pad. Making sure the pad makes full contact with the end-face surface. Wait 5 seconds for the surface to dry.

Single Connector:



Duplex Connector:



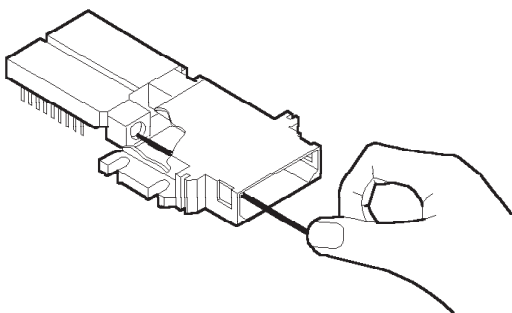
Repeat three times with fresh surfaces of the alcohol pad. Allowing 5 seconds for the surface to dry between applications.

Fiber Optic Transmitter-Receiver Subassembly (TRS)

Use this general procedure to clean a fiber optic TRS.

Note: The optical ports of the TRS should be cleaned *only* when reduced optical performance or visible port contamination exists. If problems exist with the function of the TRS assembly, use this procedure as a last resort to clean the ports before replacing the card.

1. Clean the inside of the optical port with a dry Microswab. These can be found in Cleaning Kit PN 46G6844.



2. Compressed gas may be used in instances where additional cleaning is required. If used, it should be applied for no more than 3-4 seconds. Compressed air is not recommended due to an accumulation of oils. If it is used, a lint free swab should be used to wipe the port after cleaning.

Note: Always check the area you have just cleaned to be sure it is free of lint or cotton fuzz.

Fiber Optic Cable and TRS Cleaning Prior to Card Replacement

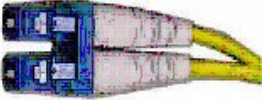
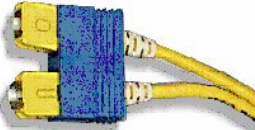
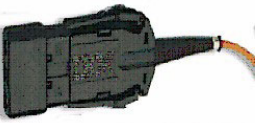



| This procedure is used to clean both the fiber optic
| connector and TRS if the fiber optic card appears to
| be failing because of problems with the TRS or the
| optical connector (such as optical power levels
| measurements out of specification). Refer to
| *Maintenance Information for Fiber Optic Links*
| *(ESCON, FICON, Coupling Links, and Open System*
| *Adapters)*, SY27-2597, for the proper measurements.

- Card Test Failure--Fiber Optic Duplex Connector
Clean the Duplex connector using the procedure in "Fiber Optic Cable Connector" on page 7.
- TRS Failure
Clean the TRS using the procedure in "Fiber Optic Transmitter-Receiver Subassembly (TRS)" on page 8.

After cleaning the fiber optic component, measure the optical power level. Replace the card as a failing component if the measurements are out of specification limits.

Common Connectors

Table 1. common connectors

Description	connector
LC Duplex used for FICON Express LX, FICON Express SX, and ISC-3	
SC Duplex used for OSA Express ATM SM, OSA Express ATM MM, FDDI, OSA Express Gigabit LX and OSA Express Gigabit SX	
ESCON Duplex used for both ESCON and ETR	
MTRJ (Multimode)	
SCDC (Single mode and multimode)	
MTP Connector used for high density fiber optic cabling on IBM eServer™ systems, storage systems, switches, and directors	

Appendix. Notices

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